Contents in this document may change without prior notice.
Please obtain the delivery specification for the final design.

7" Wide (WSVGA)

Projected Capacitive Touchscreen Display

Simple Set

TK-S Series

Model: TK-SPA07BWS-111

Simplified Specification

DMC Co., Ltd.
https://www.dush.co.jp/

25A4A7-00009-1

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1 GENERAL DESCRIPTION

1-1 OVERVIEW

TK-SPA07BWS-111 is a 7” (7” diagonal) a-Si & transmissive type thin film transistor liquid crystal display (TFT-LCD) module with LVDS interface. The module is composed of a TFT-LCD panel, driver circuit, backlight unit and projected capacitive touchscreen.

1-2 TFT LCD MODULES SPECIFICATIONS

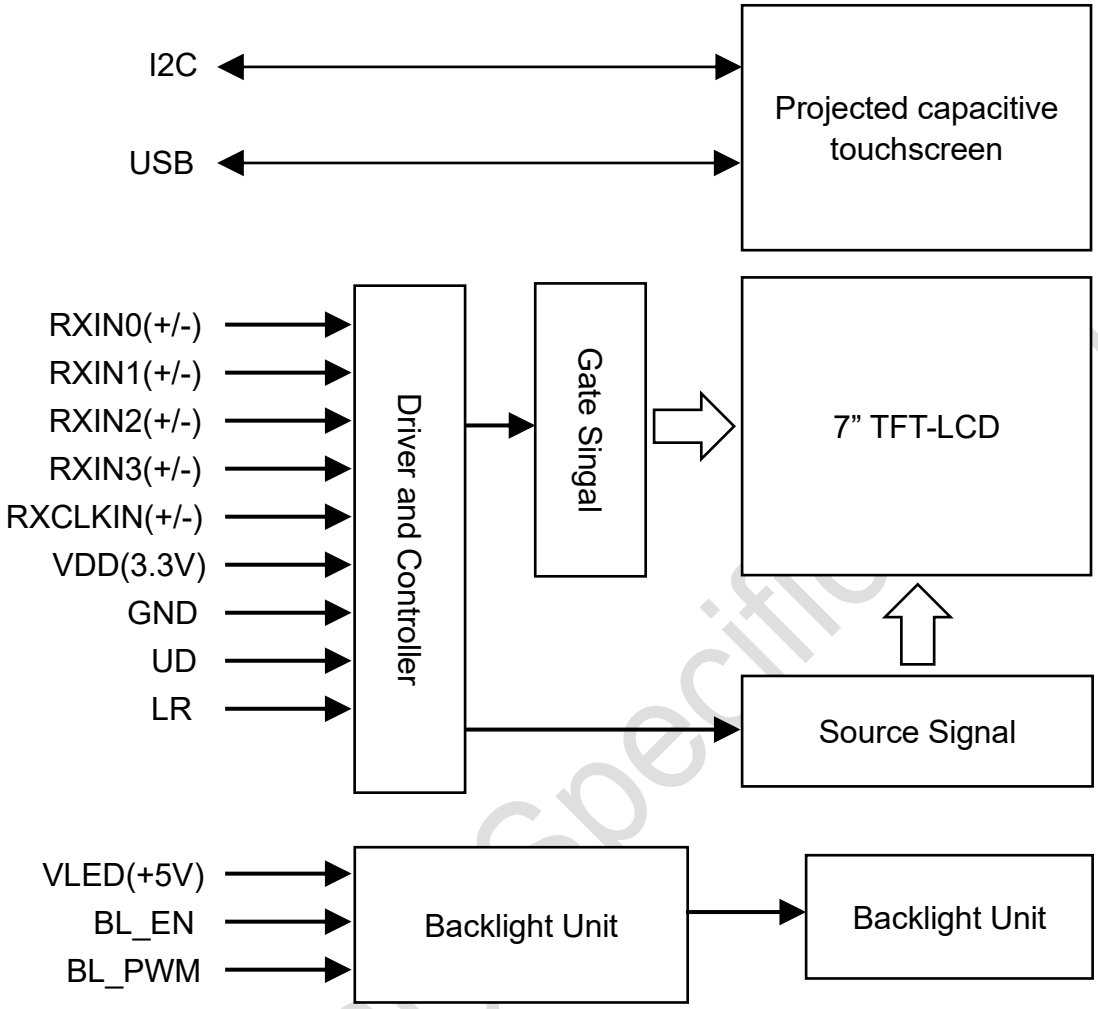
The following items are characteristics summary on the table under 25℃ condition :

Parameter	Specifications	Unit
Screen Size	7(diagonal)	inch
LCD Outline Dimension	186.0 (H) x 118.0 (V) x 12.01 (D) (T.B.D)	mm
LCD Active Area	154.21 (H) x 85.92(V)	mm
Resolution	1024 (H) x (R,G,B) x 600 (V)	
Pixel Pitch	0.1506(H) x 0.1432(V)	mm
Pixel Arrangement	RGB Vertical Stripe	
Display Mode	Normally Black	
Display Colors	16.7M	
View direction	All	
Luminance, White	440	cd/m^2
LCD Interface	LVDS	
Surface treatment	Clear	
Weight	(T.B.D)	g
RoHS Compliance	Yes	

1-3 TOUCHSCREEN SPECIFICATIONS

Parameter	Specifications	Unit
Method	Projected Capacitive	
Touchscreen Structure	Cover Glass + Film/Film (GFF)	
Host Interface	I2C (3.3V), USB	

2 BLOCK DIAGRAM



3 ABSOLUTE MAXIMUM RATINGS

3-1 ABSOLUTE RATINGS OF ENVIRONMENT

Parameter	Symbol	MIN.	MAX.	Unit	Remark
Operating temperature	TOP	-20	70	°C	Ambient temperature
Storage temperature	TST	-30	80	°C	Ambient temperature

4 TFT LCD MODULE SPECIFICATIONS

4-1 ELECTRICAL ABSOLUTE RATINGS

Parameter	Symbol	MIN.	MAX.	Unit	Remark
Power Supply voltage	V_{DD}	-0.3	3.96	V	

4-2 ELECTRICAL CHARACTERISTICS

4-2-1 TFT LCD MODULE

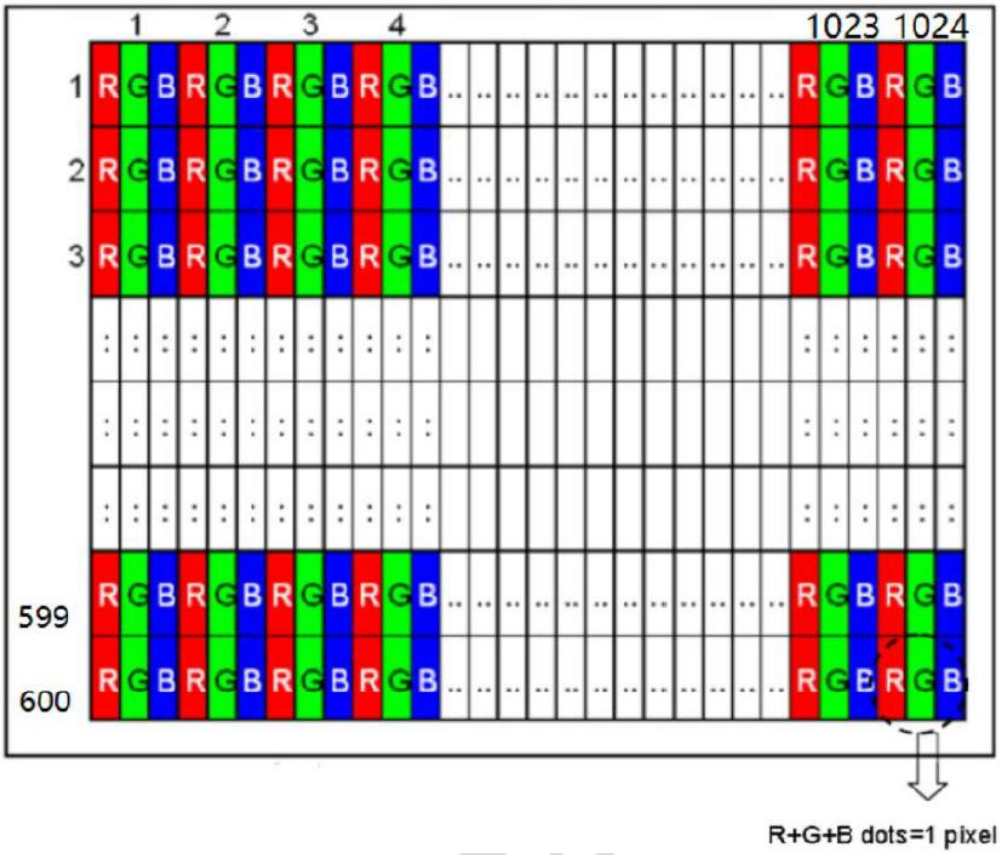
Ta=25°C

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Power Supply voltage	V_{DD}	3.0	3.3	3.6	V	
Power Supply Current	I_{DD}		TBD		mA	V_{DD} =3.3V

4-2-2 BACKLIGHT UNIT SPECIFICATION

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Input Voltage		VLED	4.5	5	5.5	V	
Input Current		IVLED		TBD		mA	VLED=5V
EN Control level	Backlight ON	LED_EN	2.5	3.3	5	V	
	Backlight OFF		0	-	0.5	V	
PWM Control level	High Level	LED_PWM	2.5	3.3	5	V	
	Low Level		0	-	0.5	V	
PWM Control Duty Ratio		-	0.1	-	100	%	100Hz-200Hz
			0.25	-	100	%	200Hz-500Hz
			0.5	-	100	%	500Hz-1kHz
			1	-	100	%	1kHz-2kHz
			2.5	-	100	%	2kHz-5kHz
			5	-	100	%	5kHz-10kHz
			10	-	100	%	10kHz-20kHz
			15	-	100	%	20kHz-30kHz
PWM Control Frequency		F_{PWM}	100		30k	Hz	
Power Consumption		P_{LED}	-	-	TBD	W	VLED=5V
LED Life Time		LT	30,000	50,000	-	Hours	

4-3 PIXEL FORMAT IMAGE



4-4 SCANNING DIRECTION

The following figures show the image see from the front view. The arrow indicates the direction of scan.

Fig.1 Normal Scan

Fig.2 Reverse Scan

Fig.1 Normal Scan (Pin 25, UD = Low and Pin 26, LR = High)
Fig.2 Reverse Scan (Pin 25, UD = High or NC and Pin 26, LR = Low or NC)

4-5 INTERFACE CONNECTION

Connector Manufacturer Hirose

Model Number DF19G-30P-1H

Pin No.	Symbol	Function
1	RXIN0-	Negative LVDS differential data input
2	RXIN0+	Positive LVDS differential data input
3	GND	Power ground
4	RXIN1-	Negative LVDS differential data input
5	RXIN1+	Positive LVDS differential data input
6	GND	Power ground
7	RXIN2-	Negative LVDS differential data input
8	RXIN2+	Positive LVDS differential data input
9	GND	Power ground
10	RXCLKIN-	Negative LVDS differential clock input
11	RXCLKIN+	Positive LVDS differential clock input
12	GND	Power ground
13	RXIN3-	Negative LVDS differential data input
14	RXIN3+	Positive LVDS differential data input
15	GND	Power ground
16	VLED(+5V)	LED Drive Power supply:+5V
17	VLED(+5V)	LED Drive Power supply:+5V
18	BL_EN	Backlight enable input. High: On; Low: Off
19	BL_PWM	Backlight PWM dimming control input.
20	VDD(3.3V)	Power voltage for digital circuit
21	GND	Power ground
22	GND	Power ground
23	GND	Power ground
24	GND	Power ground
25	UD	Gate Driver Up/down scan setting: When UD=”H”, Down to UP scan; (Default) When UD=”L”, Up to Down scan.
26	LR	Source Driver internal shift register is controlled by this pin: When LR=”L”, Right to Left scan; (Default) When LR=”H”, Left to Right scan.
27	GND	Power ground
28	Reserved	Reserved pin. Connect to GND.
29	GND	Power ground
30	GND	Power ground

5 TOUCHSCREEN SPECIFICATIONS

5-1 MECHANICAL CHARACTERISTICS

Parameter	Value
Operating Life	Input (finger) 5,000,000 hits
Light Transmittance	Min 87%
Surface Hardness	(T.B.D)
Surface Treatment	None (Clear)

5-2 TOUCHSCREEN CONTROLLER SPECIFICATIONS

Item		Specifications	Remark
Host Interface		I2C, USB	
Number to Output		10 [Finger]	
Report rate		100Hz	Note1
I2C Interface	Support mode	Standard-mode, Fast-mode	
	Data Rate	Standard-mode : 100KHz Fast-mode : 400KHz	
USB Interface	USB Standards	USB2.0 Full-Speed	

Note 1 Values are for 5 points. Varies depending on usage environment and conditions.

5-3 ELECTRICAL ABSOLUTE RATINGS

Parameter	Symbol	MIN.	MAX.	Unit	Remark
Power Supply Voltage	V_{DD_I2C}	-0.3	3.63	V	I2C

5-4 ELECTRICAL CHARACTERISTICS

5-4-1 I2C INTERFACE

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Power Supply voltage	V_{DD}	2.97	3.3	3.63	V	
Power Supply Current	I_{DD}		75		mA	Operation
			20		mA	Idle
“H” level logical input voltage	V_{IH}	0.9	-	3.63	V	
“L” level logical input voltage	V_{IL}	0	-	0.5	V	
“H” level logical output voltage	V_{OH}	V_{DD}-0.4	-	V_{DD}	V	
“L” level logical output voltage	V_{OL}	0		0.4	V	

5-4-2 USB INTERFACE

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Power Supply Current	I_{DD}		85		mA	Operation
			40		mA	Idle
"H" level logical input voltage	V_{IH}	0.9	-	3.63	V	RESET
"L" level logical input voltage	V_{IL}	0	-	0.5	V	RESET

5-5 INTERFACE CONNECTION

5-5-1 I2C INTERFACE CONNECTION

Connector Manufacturer CONTACT TECHNOLOGY
Model Number FPC05L-1506-BHF-S304 or Compatible

Pin No.	Symbol	Function
1	VDD	Power supply for Touchscreen
2	SCL	I2C Clock
3	SDA	I2C Data
4	INT	I2C Interrupt
5	RESET	Terminal for external reset signal input. Setting this pin "active Low(L)" makes the Touchscreen controller to the reset. Minimum pulse width 10msec.
6	GND	Ground

5-5-2 USB INTERFACE CONNECTION

Connector Manufacturer JST
Model Number SM06B-SRSS-TB or Compatible
Mating Connecter Model Number SHR-06V-S-B

Pin No.	Symbol	Function
1	VBUS	VBUS (5V), Power supply for Touchscreen
2	D-	USB D-
3	D+	USB D+
4	USB_GND	USB Ground
5	RESET	Terminal for external reset signal input. Setting this pin "active Low(L)" makes the Touchscreen controller to the reset. Minimum pulse width 10msec.
6	GND	Ground

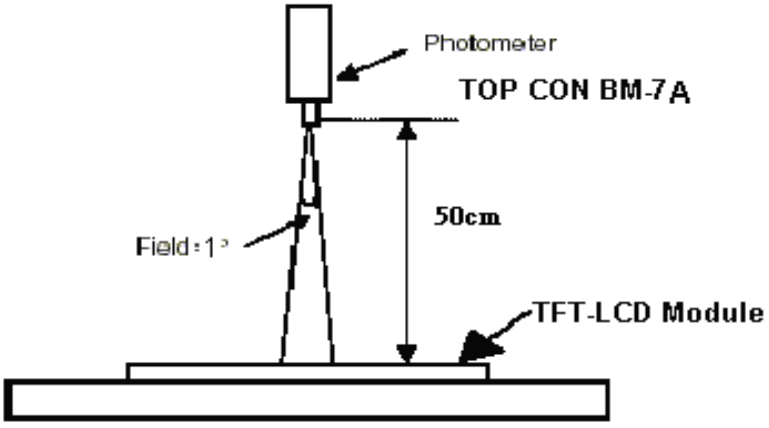
6 OPTICAL SPECIFICATIONS

6-1 OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle	Left	Θx+	CR≥10	80	-	-	Deg.	Note 1,4
	Right	Θx-		80	-	-		
	Top	Θy-		80	-	-		
	Bottom	Θy+		80	-	-		
Contrast ratio		CR	At optimized viewing angle	800	1000	-		Note 1,3
Response time		Tr+Tf	θ=0°	-	25	35	ms	Note 1,6
Uniformity		B-uni	θ=0°	75	80	--	%	Note 1,5
Luminance of white			θ=0°	350	440	--	cd/m2	Note 1,2
White chromaticity		W_X	θ=0°	Typ -0.05	0.33	Typ +0.05		Note 1,7
		W_y			0.34			

The following optical specifications shall be measured in a darkroom or equivalent state (ambient luminance ≤1 lux, and at room temperature). The operation temperature is 25°C±2°C. The measurement method is shown in Note1.

Note1: The method of optical measurement



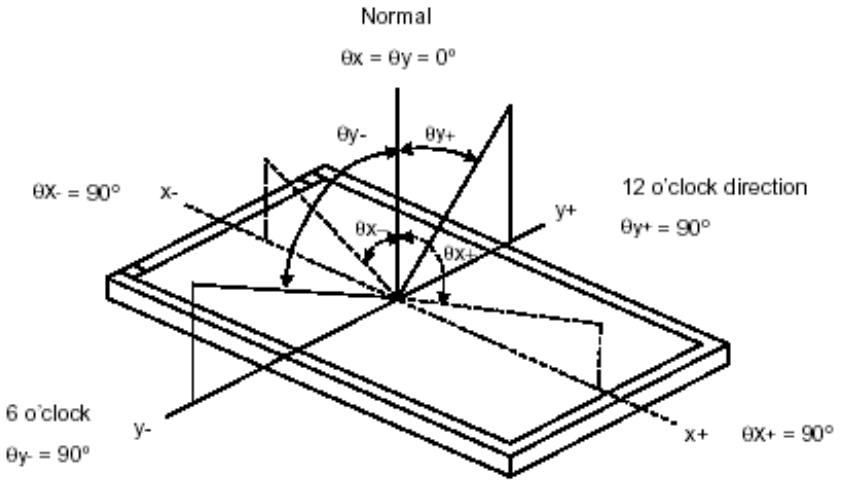
Note2: Measured at the center area of the panel and at the viewing angle of the θx=θy =0°

Note3: Definition of contrast ratio (CR):

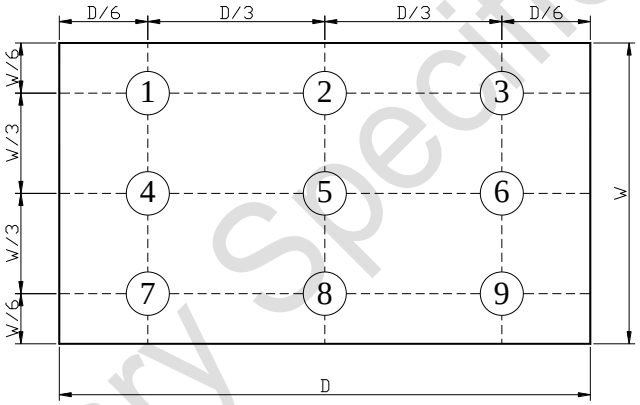
Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance with all pixels in White state}}{\text{Luminance with all pixels in Black state}}$$

Note 4: Definition of viewing angle:
Refer to figure as below.



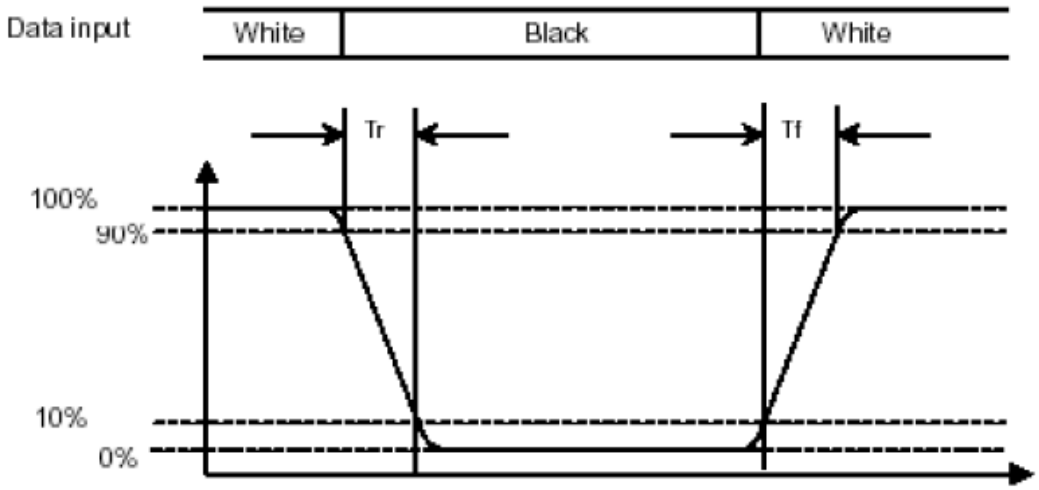
Note 5: Definition of Brightness Uniformity (B-uni):



$$\text{B-uni} = \frac{\text{Minimum luminance of 9 points}}{\text{Maximum luminance of 9points}} \quad \text{(Note 5).}$$

Note6: Definition of Response Time:

The Response Time is set initially by defining the “Rising Time (Tr)” and the “Falling Time (Tf)” respectively. Tr and Tf are defined as following figure.



Note 7: Definition of Chromaticity:

The color coordinates (Wx,Wy), are obtained with all pixels in the viewing field at white states, respectively.

7 MECHANICAL SPECIFICATIONS

7-1 OUTLINE DRAWING

(T.B.D)

8 PACKAGING

(T.B.D)

9 PRECAUTION

9-1 HANDLING PRECAUTIONS

(1) The module should be assembled into the system firmly by using every mounting hole. Be careful not to twist or bend the module.
(2) Be sure to fix the LCD when mounting the module to a chassis. Since the LCD and the touchscreen are attached with double-sided tape, the LCD may fall off if only the touchscreen side is fixed.
(3) For stable brightness and display, connect the GND via the mounting hole on the LCD.
(4) Make sure the specified temperature and humidity between the module and other structures or parts are taken into consideration to secure ventilation.
(5) While assembling or installing modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.
(6) Use fingerstalls or soft gloves in order to keep the display clean during the incoming inspection and assembly process.
(7) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they are left on panel for a long time.
(8) The LCD contains irritants inside. If by any chance the liquid should flow out due to damage and come in contact with the skin, wash immediately under running water for more than 15 minutes and consult a physician.
(9) LCD may have uneven brightness depending on the contents displayed. Please note that this is not a malfunction.
(10) LCD elements may have spots (black spots/ bright spots). This is a characteristic of the LCD and not a malfunction.
(11) When the screen is viewed outside the viewing angle, the color displayed may appear to change. This is a basic characteristic of the LCD and not a malfunction.
(12) When the same image is displayed for a certain long period of time, the image may remain as an afterimage. This is a basic characteristic of the LCD.
In order to avoid afterimages, use a screensaver or other similar functions to periodically change the displayed image and avoid displaying the same image for a long period of time.
(13) Protect the module from static electricity, it may cause damage to the C-MOS Gate Array IC.
(14) Operators should take anti-static measures such as wearing earthing bands for grounding.
(15) To prevent malfunction or damage, make sure the connectors of the connecting cables are inserted securely.
(16) Remove the protection sheet on the touchscreen when installing.
(17) Do not disassemble the module.
(18) Do not pull or fold the LED wire.
(19) Pins of I/F connector should not be touched directly with bare hands.
(20) This product is intended for use in general electronic equipment and is not intended for use in special environments such as a corrosive gas atmosphere. If use in a special environment is anticipated, please evaluate thoroughly or take precautions not to expose the LCD to corrosive gases, etc.
(21) This product is intended for use in standard applications (office equipment, industrial, communication, household equipment, etc.). Do not use the products for special applications that require extremely high reliability (e.g., aerospace, nuclear power control, medical applications for life support, etc.) or where malfunctions or failures may directly cause injuries

to the human body.

(22) Do not rub or press the product with hard or sharp objects.

(23) Keep away from flames/fire.

(24) Avoid wiping the product with excessive pressure.

(25) Avoid locally rubbing the product with strong pressure. It may cause damage to the function of the touchscreen.

(26) Do not pull off or disassemble the product.

(27) If there are changes in the ambient environment or some elements that change electric fields (capacitors with large capacity, power units, and materials with high permittivity such as metals) are close to the product, they might affect the coordinate detection. Make sure to keep a good distance from the above unstable elements as much as possible when designing.

(28) The touchscreen surface is made of glass. Glass becomes easy to break if scratched. Please handle with care and avoid glass from hitting other glass and hard objects.

(29) Touchscreen may not operate correctly when there is moisture on the surface. When moisture is detected on the touchscreen surface, please wipe it dry before use.

(30) Due to the characteristics of the touchscreen, a position slightly outside the displayed area might be recognized as a coordinate position. Please give adequate consideration to it and design applications.

(31) Be careful when handling the end face of the glass as operators easily get injured.

9-2 STORAGE PRECAUTIONS

(1) High temperature or humidity may reduce the performance of the module. Please store LCD module at room temperature: 25+/-5℃, humidity: 30~65%.

(2) It is dangerous that moisture comes into or contacts the LCD module, because the moisture may damage LCD module when it is operating.

(3) It may reduce the display quality if the ambient temperature is lower than 10 ºC. For example, the response time will become slow and the starting voltage of LED will be higher than the room temperature.

(4) When storing the product, use the packing box and keep the product within the specified storage temperature and humidity and in an environment where it is free of excessive pressure and loads.

9-3 OPERATION PRECAUTIONS

(1) Do not pull the I/F connector in or out while the module is operating.

(2) Always follow the correct power on/off sequence when LCD module is connecting and operating. This can prevent the CMOS LSI chips from damage during latch-up.

(3) Applications that require to press the same point on the touchscreen for a long time may cause malfunction due to the structure of the touchscreen.
The touchscreen is made of glass. Glass is easily damaged when scratched.
Please handle the touchscreen so that glass does not come in contact with other glass or hard objects.

(4) Due to the characteristics of the touchscreen, the area slightly outside the display area may be detected as the coordinates of the edge of the touchscreen. Please design your

application with this in mind.

(5) The coordinates of the touchscreen may shift over time or depend on the environment in which it is used. If the touchscreen coordinates get misaligned, please perform the coordinate calibration.

(6) When used outside the specification standards, it may significantly affect the product quality and service life, such as degradation of display quality and generation of air bubbles. Please be sure to use it within the standards.

(7) When operating the product, please avoid striking it with a hard object.

(8) Avoid using the product in direct sunlight.

10 Warranty

The warranty period is limited to 12 months (1 year) from the date of shipment. Any defects that occur upon normal use under conditions specified herein will be repaired (factory repair) free of charge. (Warranty for any repair needed to the same repaired part of the same product is three months.)

You will be liable for all repair fees even within the warranty period for any conditions listed below.

(1) Any malfunctions, defects, and/or damages that occurred during transport, transfer, or mishandling by the user after delivery.

(2) Any malfunctions, defects, and/or damages caused by natural or man-made disaster.

(3) If the product is used under any condition, environment, or method other than those specified in the specifications, catalogs, manuals, notes, and/or other documents.

(4) Any malfunctions, defects, and/or damages caused by connected equipment and/or usage of inappropriate consumables and media.

(5) If the product is repaired, remodeled, modified, or disassembled by a party other than DMC Co., Ltd, or if a serial number label cannot be verified.

(6) Any failure, damage, or malfunction is deemed to be caused on your behalf.

This warranty covers only the product itself. No warranty is provided for damage, on-site repair, or replacement resulting from product failure.

1st Edition, June 2025
DMC Co., Ltd.
URL: https://www.dush.co.jp/